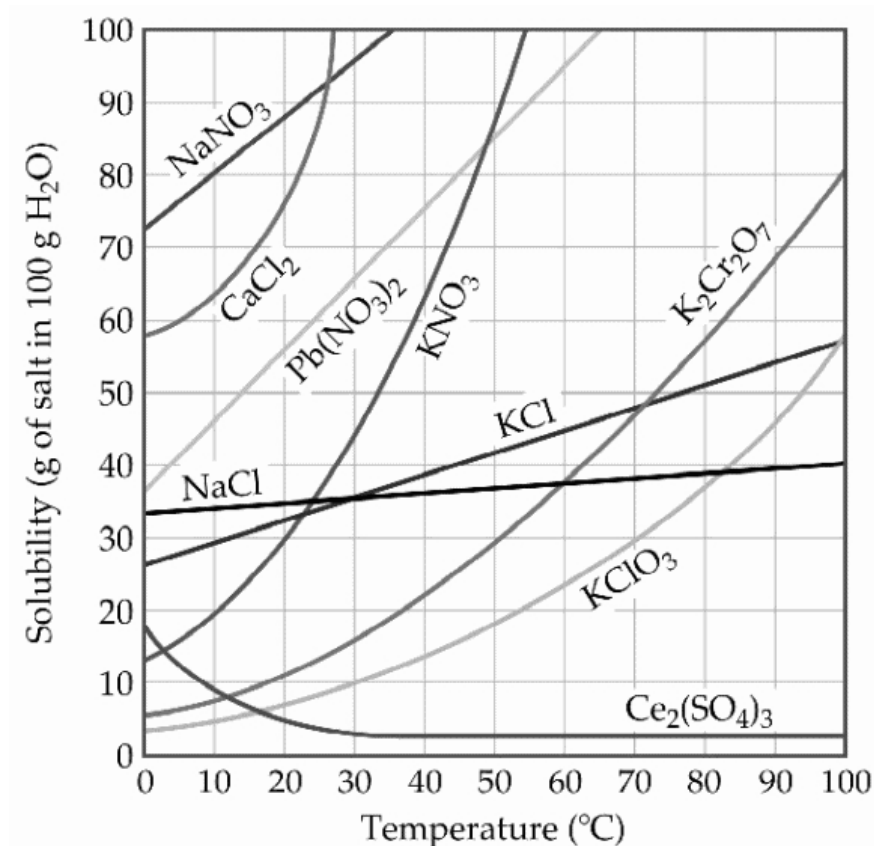


Chemistry Unit 8 Exam Review

Name _____

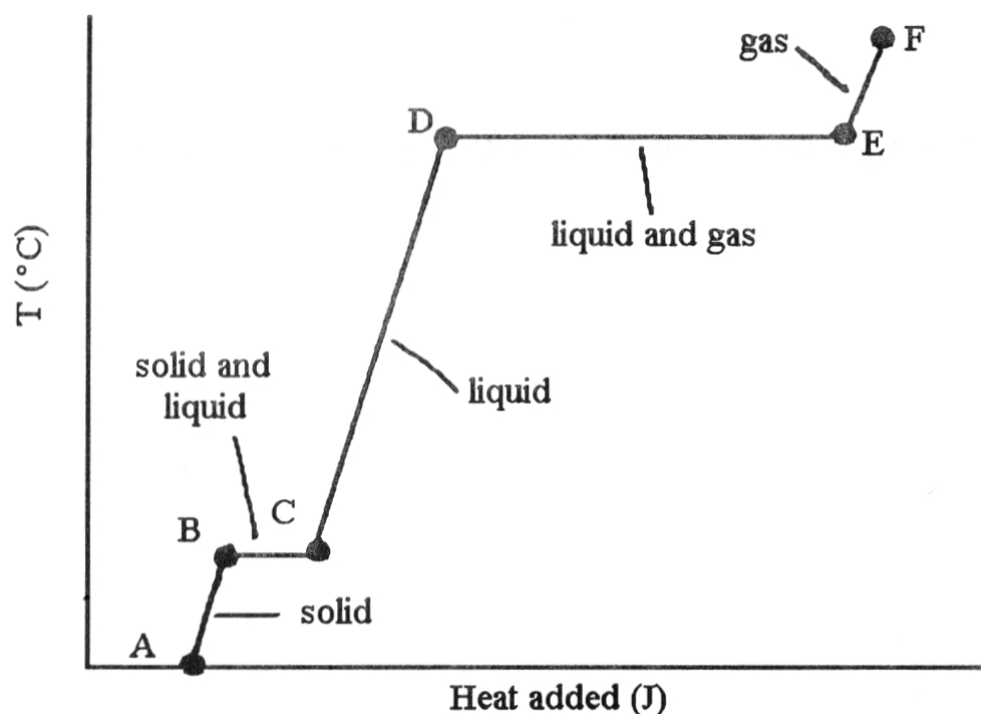
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Molality is defined as the _____. 1) _____
A) moles solute/Liters solution
B) moles solute/moles solvent
C) moles solute/kg solvent
D) moles solute/kg solution
E) none (dimensionless)
- 2) Which produces the greatest number of ions when one mole dissolves in water? 2) _____
A) NaCl B) NH_4Cl C) Na_2SO_4 D) NH_4NO_3 E) sucrose
- 3) Which of the following aqueous solutions will have the highest boiling point? 3) _____
A) 0.10 m NaCl
B) 0.20 m glucose
C) 0.10 m SrSO_4
D) 0.25 m sucrose
E) 0.10 m Na_2SO_4

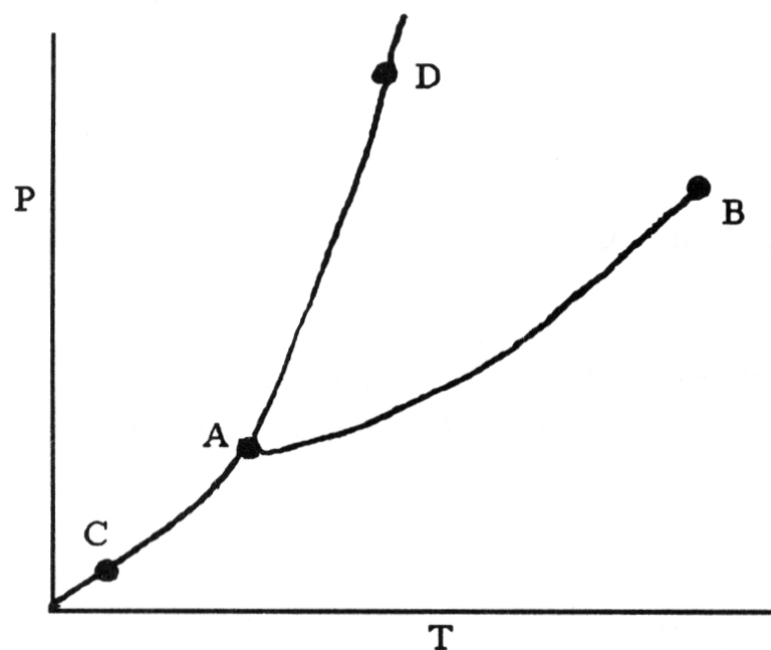


- 4) A sample of potassium nitrate (49.0 g) is dissolved in 101 g of water at 100°C, with precautions taken to avoid evaporation of any water. The solution is cooled to 30.0°C and no precipitate is observed. This solution is _____. 4) _____
- A) saturated
 - B) hydrated
 - C) placated
 - D) unsaturated
 - E) supersaturated
- 5) A sample of potassium chlorate (15.0 g) is dissolved in 201 g of water at 70°C, with precautions taken to avoid evaporation of any water. The solution is cooled to 30.0°C and no precipitate is observed. This solution is _____. 5) _____
- A) supersaturated
 - B) hydrated
 - C) saturated
 - D) miscible
 - E) unsaturated
- 6) A sample of potassium nitrate (49.0 g) is dissolved in 101 g of water at 100°C, with precautions taken to avoid evaporation of any water. The solution is cooled to 30.0°C and a small amount of precipitate is observed. This solution is _____. 6) _____
- A) hydrated
 - B) unsaturated
 - C) saturated
 - D) placated
 - E) supersaturated

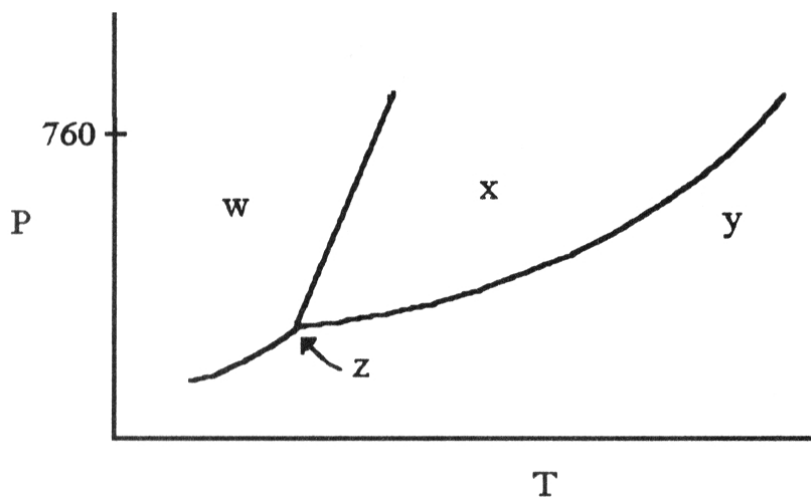
- 7) The solubility of MnSO_4 monohydrate in water at 20°C is 70.0 g per 100.0 mL of water. A solution at 20°C that is 4.22 M in MnSO_4 monohydrate is best described as a(n) _____ solution. The formula weight of MnSO_4 monohydrate is 168.97 g/mol. 7) _____
 A) solvated
 B) supersaturated
 C) hydrated
 D) saturated
 E) unsaturated
- 8) The concentration of KBr in a solution prepared by dissolving 2.21 g of KBr in 897 g of water is _____ molal. 8) _____
 A) 0.0207
 B) 2.46
 C) 0.0186
 D) 0.0167
 E) 2.07×10^{-5}
- 9) The concentration of a benzene solution prepared by mixing 12.0 g C_6H_6 with 38.0 g CCl_4 is _____ molal. 9) _____
 A) 4.04 B) 0.508 C) 0.622 D) 0.240 E) 0.316
- 10) The concentration of HCl in a solution that is prepared by dissolving 5.5 g of HCl in 200 g of $\text{C}_2\text{H}_6\text{O}$ is _____ molal. 10) _____
 A) 7.5×10^{-4} B) 3.3×10^{-2} C) 27.5 D) 1.3 E) 0.75
- 11) The freezing point of ethanol ($\text{C}_2\text{H}_5\text{OH}$) is -114.6°C . The molal freezing point depression constant for ethanol is $2.00^\circ\text{C}/m$. What is the freezing point ($^\circ\text{C}$) of a solution prepared by dissolving 50.0 g of glycerin ($\text{C}_3\text{H}_8\text{O}_3$, a nonelectrolyte) in 200.0 g of ethanol? 11) _____
 A) -114.6 B) -5.42 C) -132.3 D) -115 E) -120.0
- 12) What is the freezing point ($^\circ\text{C}$) of a solution prepared by dissolving 11.3 g of $\text{Ca}(\text{NO}_3)_2$ (formula weight = 164 g/mol) in 115 g of water? The molal freezing point depression constant for water is $1.86^\circ\text{C}/m$. 12) _____
 A) -3.34 B) -1.11 C) 3.34 D) 1.11 E) 0.00
- 13) A solution containing 10.0 g of an unknown liquid and 90.0 g water has a freezing point of -3.33°C . Given $K_f = 1.86^\circ\text{C}/m$ for water, the molar mass of the unknown liquid is _____ g/mol. 13) _____
 A) 161 B) 69.0 C) 619 D) 333 E) 62.1
- 14) Calculate the freezing point (0°C) of a 0.05500 m aqueous solution of glucose. The molal freezing-point-depression constant of water is $1.86^\circ\text{C}/m$. 14) _____
 A) -0.204 B) 0.0286 C) -0.0562 D) 0.106 E) -0.102



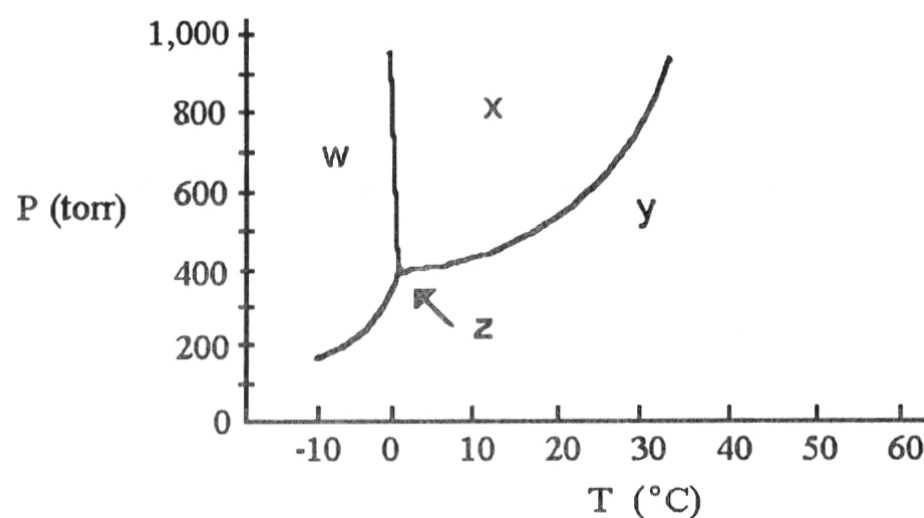
- 15) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the liquid of the substance. 15) _____
- A) AB B) BC C) CD D) DE E) EF
- 16) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the solid. 16) _____
- A) AB B) BC C) CD D) DE E) EF
- 17) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the gas. 17) _____
- A) AB B) BC C) CD D) DE E) EF
- 18) The heating curve shown was generated by measuring the heat flow and temperature of a solid as it was heated. The heat flow into the sample in the segment _____ will yield the value of the ΔH_{fusion} of this substance. 18) _____
- A) AB B) BC C) CD D) DE E) EF



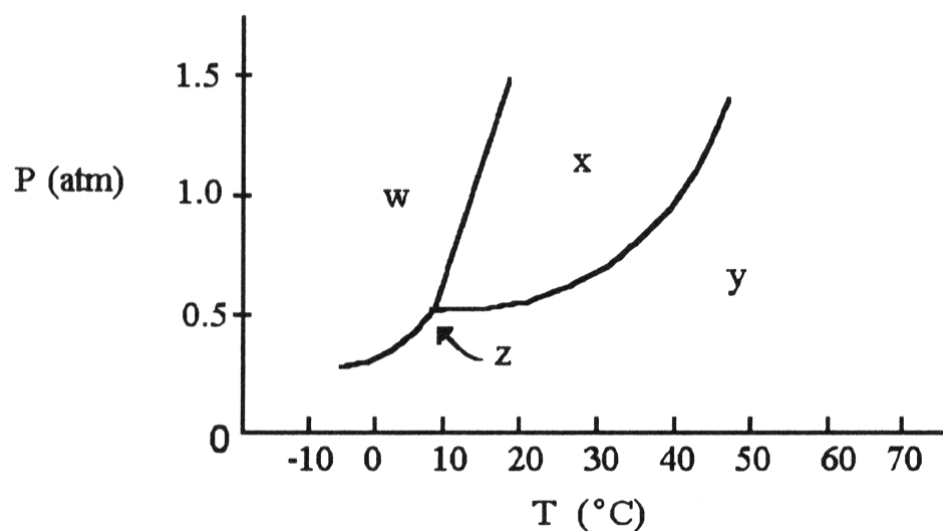
- 19) On the phase diagram shown above, segment _____ corresponds to the conditions of temperature and pressure under which the solid and the gas of the substance are in equilibrium. 19) _____
- A) AC B) AD C) CD D) BC E) AB
- 20) On the phase diagram shown above, the coordinates of point _____ correspond to the critical temperature and pressure. 20) _____
- A) A B) B C) C D) D E) E



- 21) The phase diagram of a substance is given above. The region that corresponds to the solid phase is _____. 21) _____
- A) w B) x C) y D) z E) x and y



- 22) The phase diagram of a substance is shown above. The area labeled _____ indicates the gas phase for the substance. 22) _____
 A) w B) x C) y D) z E) y and z
- 23) According to the phase diagram shown above, the normal boiling point of this substance is _____ °C. 23) _____
 A) -3 B) 0 C) 10 D) 38 E) 29
- 24) Calculate the energy absorbed by 25.0 grams of ice at -4.00°C that is heated to water vapor at 110.0°C. The specific heats of ice, water, and steam are 2.09 J/g°C, 4.18 J/g°C, and 1.70 J/g°C, respectively. For H₂O, $\Delta H_{fus} = 334 \text{ J/g}$ and $\Delta H_{vap} = 2260 \text{ J/g}$. 24) _____
 A) 11100 J B) 11200 J C) 100000 J D) 75931 J E) 64800 kJ
- 25) The heat of fusion of water is 334 J/g. The heat capacity of liquid water is 4.18 J/g°C. The conversion of 50.0 g of ice at 0.00°C to liquid water at 22.0°C requires _____ J of heat. 25) _____
 A) 17200
 B) 3800
 C) 21298
 D) 4690
 E) Insufficient data are given.
- 26) A solution is prepared by diluting 38 mL of a 45% (v/v) calcium chloride to 500.0 mL. What is the concentration of the new solution? 26) _____
 A) 88 B) 44 C) 11 D) 3.4 E) 500



- 27) The phase diagram of a substance is given above. This substance is a _____ at 25°C and 1.0 atm. 27) _____
- A) liquid
 - B) crystal
 - C) supercritical fluid
 - D) solid
 - E) gas
- 28) On a phase diagram, the critical pressure is _____. 28) _____
- A) the pressure at which a liquid changes to a gas
 - B) the pressure above which a substance is a liquid at all temperatures
 - C) the pressure below which a substance is a solid at all temperatures
 - D) the pressure required to melt a solid
 - E) the pressure required to liquefy a gas at its critical temperature
- 29) On a phase diagram, the critical temperature is _____. 29) _____
- A) the temperature required to melt a solid
 - B) the temperature below which a gas cannot be liquefied
 - C) the temperature above which a gas cannot be liquefied
 - D) the temperature at which all three states are in equilibrium
 - E) the temperature required to cause sublimation of a solid